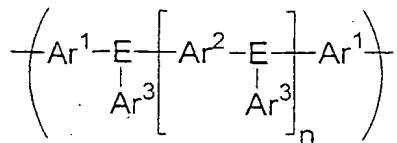


Claims

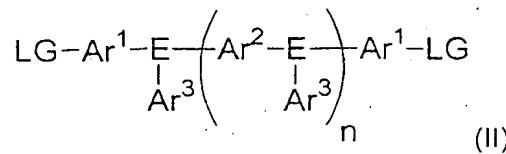
- 1) An oligomer or polymer comprising a first repeat unit and a second repeat unit that may be the same or different, the first repeat unit having formula (I):



5 (I)

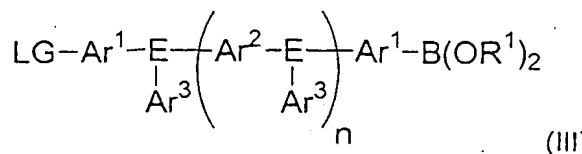
wherein each E independently represents optionally substituted nitrogen or optionally substituted phosphorus, with the proviso that at least one E is optionally substituted phosphorus; each Ar¹, Ar² and Ar³ is the same or different and independently represents an optionally substituted aryl or heteroaryl; n is 0-3; and in the case of unsubstituted nitrogen and phosphorus, the second repeat unit is directly conjugated to the first repeat unit.

- 10
- 2) An oligomer or polymer according to claim 1 wherein each Ar¹, Ar² and Ar³ is an optionally substituted phenyl.
- 15
- 3) An oligomer or polymer according to claim 1 or 2 wherein at least one Ar³ is substituted by a substituent selected from the group consisting of optionally substituted, branched, cyclic or linear C₁₋₂₀ alkyl or C₁₋₂₀ alkoxy; C₁₋₂₀ fluoroalkyl, fluorine, optionally substituted diarylamine and optionally substituted diarylphosphine.
- 20
- 4) An oligomer or polymer according to any preceding claim wherein E is selected from the group consisting of nitrogen, unsubstituted phosphorus or phosphorus oxide.
- 5) An oligomer or polymer according to any preceding claim wherein the second repeat unit is different from the first repeat unit.
- 25
- 6) An oligomer or polymer according to any preceding claim which comprise three or more different repeat units.
- 7) An oligomer or polymer according to claim 5 and / or claim 6 wherein the second repeat unit and optionally further repeat units are selected from optionally substituted phenyl, fluorene, spirobifluorene, indenofluorene, heteroaryl, dihydrophenanthrene and / or triarylamine.
- 30
- 8) A method of forming an oligomer or polymer according to any preceding claim comprising the step of oligomerising or polymerising a monomer of formula (II) in the presence of a metal catalyst of variable oxidation state:



wherein Ar^1 , Ar^2 and Ar^3 , E and n are as defined in any one of claims 1-4 and each LG is the same or different and represents a leaving group capable of participating in a polycondensation mediated by a metal of variable oxidation state.

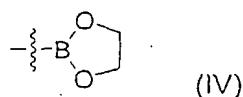
- 5 9) A method according to claim 8 wherein each LG is the same or different and is independently selected from halogen; a reactive boronic group selected from a boronic acid group, a boronic ester group and a borane group; or a moiety of formula $-\text{O-SO}_2-\text{Z}$ wherein Z is selected from the group consisting of optionally substituted alkyl and aryl.
- () 10) A method according to claim 9 wherein each LG is independently a halogen or a moiety of formula $-\text{O-SO}_2-\text{Z}$, and the monomer of formula (II) is oligomerised or polymerised in the presence of a nickel complex catalyst.
- 11) A method according to claim 9 wherein the monomer of formula (II) is oligomerised or polymerised with a second aromatic monomer in the presence of a palladium complex catalyst and a base and
- 15 a. each LG is the same or different and comprises a reactive boronic group and the second monomer comprises two reactive groups independently selected from halogen and a moiety of formula $-\text{O-SO}_2-\text{Z}$, or
- 20 b. each LG independently comprises a halogen or a moiety of formula $-\text{O-SO}_2-\text{Z}$ and the second monomer comprises two reactive boron groups which are the same or different
- 12) A method according to claim 9 wherein one LG is a reactive boron group; the other LG is a halogen or a moiety of formula $-\text{O-SO}_2-\text{Z}$; and the monomer of formula (II) is oligomerised or polymerised in the presence of a palladium complex catalyst and a base.
- 25 13) A monomer comprising a repeat unit of formula (III):



wherein Ar^1 , Ar^2 and Ar^3 , E , LG and n are as defined in any one of claims 1-4; each R^1 independently represents hydrogen or optionally substituted, branched, cyclic or

linear C₁₋₂₀ alkyl, aryl or heteroaryl; and both groups R¹ associated with the same boron atom may be joined to form a ring.

- 14) A monomer as defined in claim 13 wherein LG has a formula -B(OR¹)₂
- 15) A monomer according to claim 13 or 14 wherein at least one R¹ represents a linear, branched or cyclic C₁₋₂₀ alkyl.
- 5 16) A monomer according to any one of claims 13-15 wherein the at least one group -B(OR¹)₂ represents an optionally substituted residue of formula (IV):



- 17) A monomer according to claim 16 wherein at least one carbon atom of the residue of formula (IV) is substituted.
- 10 18) An optical device comprising an oligomer or polymer according to any one of claims 1-7.
- 19) An optical device according to claim 18 wherein the oligomer or polymer is located in a layer between a first electrode for injection of holes and a second electrode for injection of electrons.
- 15 20) An optical device according to claim 19 wherein the device is an electroluminescent device.
- 21) A switching device comprising an oligomer or polymer according to any one of claims 1-7.
- 20 22) A field effect transistor comprising an insulator having a first side and a second side; a gate electrode located on the first side of the insulator; an oligomer or polymer according to any one of claims 1-7 located on the second side of the insulator; and a drain electrode and a source electrode located on the oligomer or polymer.
- 23) An integrated circuit comprising a field effect transistor according to claim 22.